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# Questions linger about GenX

## NC Health says the man-made compound poses 'low risk' to human health

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RALEIGH -- A North Carolina scientist who has investigated how GenX affects mice is wary about using any one study to explain the compound's effect on humans -- at least until more research can be conducted.

"We can't really say this has no risk to humans because we don't even know to what degree humans are exposed," said Jamie DeWitt, an East Carolina University professor of pharmacology and toxicology. "You can't discount what's in the environment until you measure what's in people."

Late Monday, the N.C. Department of Health and Human Services' Occupational and Environmental Epidemiology Branch issued a memo on the chemical, stating existing research indicates GenX is "expected to pose a low risk to human health." GenX is manufactured at Chemours' Fayetteville Works Plant about 100 miles up the Cape Fear River from Wilmington and has been found in the river on three separate occasions.

The health department did not respond Tuesday to a question asking whether the agency has a formal stance on GenX.

### 'More than 100 times greater'

GenX is defined as an emerging contaminant, meaning it is fairly new -- it was first commercially manufactured in 2009 -- and there is not a great deal of knowledge about it. The classification also means the federal standards that

**would potentially be enforced** in better-defined situations are years away from existence.

The health department's memo is based on a review of the available research and reporting on the chemical, which belongs to the same family of fluorinated compounds as C8, or PFOA. C8 was previously manufactured at the plant before Chemours agreed to cease manufacture in the face of mounting lawsuits and regulator concern, at which point it was replaced by GenX -- a compound advertised as a safer alternative.

Referenced in the report is a two-year chronic toxicity and cancer study published in 2015. That research was conducted on rats, reporting a toxicity a level that, according to the DHHS memo, corresponds to 70,909 parts per trillion (ppt) of GenX for humans.

"Based on U.S. risk assessment calculations," the memo stated, "this corresponds to a concentration in drinking water of 70,909 (nanograms per liter, or ng/L) of GenX -- more than 100 times greater than the mean value of 631 ng/L detected in the Cape Fear River."

Nanograms per liter and parts per trillion are equivalent measurements.

### 'A single study'

The 2015 study referenced in the report was conducted by industry scientists. Often, DeWitt said, research conducted by industry scientists is done well, but adheres to a specific framework and attempts to answer a very specific set of questions -- potentially leaving its impression of a chemical's profile incomplete.

"This particular interpretation in the memo about the potential low risk is based on endpoints evaluated in a single study that was performed by industry scientists to meet testing requirements under whatever law is regulating them," she said.

The DHHS memo also notes the effects of GenX are very much unknown -- and scientists on both sides of the Atlantic are searching for answers.

In January, DeWitt's lab published a study in the journal Toxicological Sciences evaluating GenX's impacts on mice -- specifically how the compound impacts their immune system. The lab has also researched PFOA's impact on mice.

"When you do a comparison side-by-side," DeWitt said, "GenX was not toxic in the same way as PFOA."

Still, the mice did show liver enlargement, among some other effects that have been tied to chemicals in the perfluorinated compound class -- the group to which both GenX and C8 belong.

In her conclusion, DeWitt wrote, "while this study evaluated only a few endpoints, the data suggest that the test compound may differ from PFOA in its mechanism of action on the immune system and may have sex-specific effects related to accumulation and excretion in mice."

DeWitt's study was not cited in the state health department's report.

Among the major unanswered questions, she said, is whether GenX accumulates in humans -- potentially slowly building to a toxic level.

**'Don't use us as lab rats'**

In the Netherlands, the National Institute for Public Health and the Environment has **launched its own investigation** into GenX. A Dordrecht, Netherlands, plant also uses the compound.

The Dutch concluded it justified to classify GenX as a "suspected human carcinogen"

Among the questions the Dutch institute is trying answer is how much GenX accumulates in fish -- information the institute said in a May release is "essential to calculate safe concentrations in water for lifetime fish consumption by humans and wildlife."

Tuesday afternoon, an EPA spokeswoman said via email the agency is still working to gather information and determine its next steps.

The unanswered questions are what continue to worry many scientists, such as the University of North Carolina Wilmington's Larry Cahoon.

"With novel substances like this," he said, "precautionary principle says don't use us as lab rats."

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